TECHNICAL REPORT

ISO/IEC TR 10171

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Information technology — Telecommunications and information exchange between systems — List of standard data link layer protocols that utilize high-level data link control (HDLC) classes of procedures, list of standard XID format identifiers, list of standard mode-setting information field format identifiers, and list of standard user-defined parameter set identification values

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Liste de protocoles normalisés pour la couche liaison de données employant des classes de procédures de commande de liaison de données à haut niveau (HDLC) et liste d'identificateurs normalisés de format XID, liste d'identificateurs normalisés de format du champ d'information pour la programmation de mode et liste des valeurs d'identification pour les jeux de paramètres normalisés définis par les utilisateurs

Reference number
ISO/IEC TR 10171:2000(E)

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this Technical Report may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR 10171 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*.

This second edition cancels and replaces the first edition (ISO/IEC TR 10171:1994), which has been technically revised.

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Introduction

The HDLC classes of procedures have been utilized in a number of International Standards and ITU-T Recommendations as the basis for specific data link layer protocol specifications. This Technical Report provides an indication of the class of procedures and optional functions used in the realization of each designated data link layer protocol. The protocols covered include:

- ISO/IEC 7776
- ISO/IEC 8802-2 LLC type 1
- ISO/IEC 8802-2 LLC type 2
- ITU-T Recommendation G.764
- ITU-T Recommendation Q.921 (I.441) LAPD
- ITU-T Recommendation Q.922 LAPF
- ITU-T Recommendation T.90
- ITU-T Recommendation V.42
- ITU-T Recommendation V.76
- ITU-T Recommendation V.120
- ITU-T Recommendation X.25 LAPB
- ITU-T Recommendations X.25/X.32
- ITU-T Recommendation X.75 SLP
- Internet Society Request for Comments: 1662
- IEEE TR 1550

Table 1 in this Technical Report lists these protocols, indicates the basic class of procedures used, and identifies the standard optional functions used to realize the specific data link layer protocol. The footnotes following table 1 provide additional explanation concerning the application of the optional function identified. As additional standard usages of the HDLC classes of procedures are identified, this Technical Report will be updated. This Technical Report serves as the repository of record of applications of the HDLC concepts, principles and classes of procedures in the realization of standard data link layer protocols.

Table 2 in this Technical Report serves as the repository of record for the standard XID format identifiers defined in ISO/IEC 13239.

Table 3 in this Technical Report serves as the repository of record for standard mode-setting information field format identifiers.

Table 4 in this Technical Report serves as the repository of record for the list of standard user-defined parameter set identification values defined in ISO/IEC 13239.

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Information technology — Telecommunications and information exchange between systems — List of standard data link layer protocols that utilize high-level data link control (HDLC) classes of procedures, list of standard XID format identifiers, list of standard mode-setting information field format identifiers, and list of standard user-defined parameter set identification values

1 Scope

This Technical Report lists the standard data link layer protocols that utilize HDLC based classes of procedures as defined in ISO/IEC 13239 in their realization. The list indicates the basic repertoire (i.e. class of procedures) used plus the optional functions employed.

This Technical Report lists the standard XID information field format identifiers. The list identifies the source document as well as describing the characteristics of the information provided.

This Technical Report lists the standard mode-setting frame information field format identifiers. The list identifies the source document as well as describing the characteristics of the information provided.

This Technical Report lists the standard user-defined parameter set identification values, as well as indicating the source and use of the private parameter set.

NOTE - With the exception of ISO/IEC 7776 and ITU-T X.25 LAPB, which are designed to be complementary, the protocols listed do not interwork. (There are differences in the usage of certain functions by different protocols.)

2 References

ISO/IEC 7776:1995, *Information technology — Telecommunications and information exchange between systems — High-level data link control procedures — Description of the X.25 LAPB-compatible DTE data link procedures.*

ISO/IEC 8802-2:1998, *Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — Specific requirements — Part 2: Logical link control.*

ISO/IEC 13239:2000, *Information technology — Telecommunications and information exchange between systems — High-level data link control (HDLC) procedures.*

ITU-T Recommendation G.764, *Voice packetization - Packetized voice protocols.*

ITU-T Recommendation Q.921 (I.441), *ISDN user-network interface - Data link layer specification.*

ITU-T Recommendation Q.922, *ISDN data link layer specification for frame mode bearer services.*

ITU-T Recommendation T.90, *Characteristics and protocols for terminals for telematic services in ISDN.*

ITU-T Recommendation V.42, *Error-correcting procedures for DCEs using asynchronous-to-synchronous conversion.*

ITU-T Recommendation V.42bis, - *Data compression procedures for data circuit-terminating equipment (DCE) using error correction procedures.*

ITU-T Recommendation V.75, *DSVD terminal control procedures.*

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ITU-T Recommendation V.76, *Generic multiplexer using V.42 LAPM-based procedures.*

ITU-T Recommendation V.120, *Support by an ISDN of data terminal equipment with V-series type interfaces with provision for statistical multiplexing.*

ITU-T Recommendation X.25, *Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit.*

ITU-T Recommendation X.32, *Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and accessing a packet-switched public data network through a public switched telephone network or a circuit switched public data network.*

ITU-T Recommendation X.75, *Packet-switched signalling system between public networks providing data transmission services.*

Internet Society Request for Comments: 1662, *PPP in HDLC-like Framing*.

IEEE TR 1550, *Utility commission architecture, Version 2.0.*

NOTE 1 - Further study is required to determine the applicability of including ITU-T Recommendations T.30, T.70, T.71, and Signaling System No. 7 Link Layer Recommendations in this Technical Report.

NOTE 2 - As soon as the document that provide the protocol description of ADLC is identified, IEEE TR 1550 will be replaced with that information.

3 Abbreviations

ADLC	Asynchronous Data Link Control
DCE	Data Circuit-terminating Equipment
DTE	Data Terminal Equipment
FCS	Frame Check Sequence
HDLC	High-level Data Link Control
I	Information
IETF	Internet Engineering Task Force
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union - Telecommunication standardization sector (formerly CCITT)
LAPB	Link Access Procedures Balanced
LAPD	Link Access Protocol on the D-Channel
LAPM	Link Access Protocol for Modems
LLC	Logical Link Control
MAC	Medium Access Control
OSI	Open Systems Interconnection
PPP	Point-to-Point Protocol
RD	Request Disconnect
REJ	REJect
RIM	Request Initialization Mode
RSET	ReSET
SIM	Set Initialization Mode
SLP	Single Link Procedures
SM	Set Mode
SREJ	Selective REJect
TEST	Test
UI	Unnumbered Information
UIH	Unnumbered Information with Header check
UP	Unnumbered Polling
XID	eXchange IDentification

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4 Data Link Layer protocols using HDLC classes of procedures

Table 1 lists the data link layer protocols, indicates the basic class of procedures used, and identifies the standard optional functions used to realize the specific data link layer protocol. The footnotes following table 1 provide additional explanation concerning the application of the optional function identified.

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Table 1 – Applications of HDLC Classes of Procedures

		ISO/IEC 7776	ISO/IEC 8802-2 LLC[1] type 1	ISO/IEC 8802-2 LLC[1] type 2	ITU-T G.764[11]	ITU-T Q.921 (I.441) LAPD	ITU-T Q.922 LAPF	ITU-T T.90 LAPX	ITU-T V.42 LAPM	ITU-T V.76	ITU-T V.120	ITU-T X.25 LAPB	ITU-T X.25/ X.32[10]	ITU-T X.75 SLP	Internet RFC 1662	IEEE TR 1550[21] ADLC
Fundamental class of procedures																
UNC	Unbalanced operation normal response mode class															X
UAC	Unbalanced operation asynchronous response mode class															
BAC	Balanced operation asynchronous balanced mode class	X[9]		X		X	X	X	X	X	X	X	X	X[2]		
UCC	Unbalanced operation Connectionless-mode class															
BCC	Balanced operation Connectionless-mode class		X		X										X	
Optional function																
1	Add command/response:	XID		X		X	O[12]	O[12]	O[12]	X[12]	X	O		O[12]			
2	Add command/response:	REJ	X		X		X[16]	X[16]	X	X	X	O	X	X	X	X	X
3.1	Add command/response: For single individual frame retransmission	SREJ								O	O						
3.2	Add command/response: Use multi-selective reject option with individual frame indicators only	SREJ															
3.3	Add command/response: Use multi-selective reject procedure using individual I-frame indicators and span-list indicators	SREJ	O[16]				O			O	O	O	O[14]		O[14]	O[14]	
4	Add command/response:	UI					X[3]	X[3]		X	X	X					
5	Add command:	SIM															
	Add response:	RIM															
6	Add command:	UP															
7	Use extended addressing format instead of basic addressing format			X[4]	X[4]	X	X	X		O	X	X					X[4]
8	Delete response:	I	X				X		X	X	X	X	X	X	X		
9	Delete command:	I															

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		ISO/IEC 7776	ISO/IEC 8802-2 LLC[1] type 1	ISO/IEC 8802-2 LLC[1] type 2	ITU-T G.764[11]	ITU-T Q.921 (I.441) LAPD	ITU-T Q.922 LAPF	ITU-T T.90 LAPX	ITU-T V.42 LAPM	ITU-T V.76	ITU-T V.120	ITU-T X.25 LAPB	ITU-T X.25/ X.32[10]	ITU-T X.75 SLP	Internet RFC 1662	IEEE TR 1550[21] ADLC
10.1	Use modulo 128 instead of modulo 8 control field format	O[5]		X		X	X	O	X	X	X	O[6]	O[6]	O		
10.2	Use modulo 32 768 instead of modulo 8 control field format	O[5,19]										O[19]	O[19]	O[19]		
10.3	Use modulo 2 147 483 648 instead of modulo 8 control field format															
11	Add command: RSET															
12	Add command/response: TEST		X						O	O						
13	Add response: RD															X
14.1	Use the 32-bit FCS instead of the 16-bit FCS		O[7]	O[7]					O[8]	O[8]						
14.2	Use the 8-bit FCS instead of the 16-bit FCS									O						
15.1	Use start/stop transmission with basic transparency instead of synchronous transmission															
15.2	Use start/stop transmission with basic transparency and flow-control transparency instead of synchronous transmission															
15.3	Use start/stop transmission with basic transparency and control-character octet transparency instead of synchronous transmission															
16	Use seven bit transparency															
17	Use Set Mode command with optional information field in place of SXXM or SXXME SM					X										
18	Use optional information field with UA and DM response and DISC command									X						
19	Use optional information field with any mode-setting command frame									X						
20	Add command/response UIH				X					O						
21	Use multiple address fields															X

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	ISO/IEC 7776	ISO/IEC 8802-2 LLC[1] type 1	ISO/IEC 8802-2 LLC[1] type 2	ITU-T G.764[11]	ITU-T Q.921 (I.441) LAPD	ITU-T Q.922 LAPF	ITU-T T.90 LAPX	ITU-T V.42 LAPM	ITU-T V.76	ITU-T V.120	ITU-T X.25 LAPB	ITU-T X.25/ X.32[10]	ITU-T X.75 SLP	Internet RFC 1662	IEEE TR 1550[21] ADLC
22 Use frame format field															X[20]
23 Use segmentation															X
24 Inhibit bit or octet insertion															X
25 Start/stop mode intra-frame timeset															X
26 Use HCS															X
Key to table: Blank: Not used O: Optionally used X: Used															

NOTES associated with table 1 -

1 Frame delimiting is not provided by flags, but at the MAC sublayer.
2 For an interim period some networks use a two-octet control field for U-format commands and responses.
3 Used only as a command frame.
4 Uses non-HDLC standard address extension mechanism - fixed length, multiple octet address field.
5 The choice between basic and extended control field format option is made at subscription time for DTE/DCE applications and by bilateral agreement for DTE/DTE applications.
6 Extended control field format (module 128) is an option provided by some networks in the X.25 1984 and later versions. It is not provided in the X.25 1980 version.
7 FCS checking not defined as an LLC sublayer function, rather as a medium access control (MAC) sublayer function. Included here to note the use of the 32-bit FCS optional function in Local Area Network applications of HDLC procedures.
8 The 16-bit FCS is the default value. The 32-bit FCS is negotiable via an XID exchange.
9 Uses P/F check point recovery.
10 Uses turn-around check point retransmission.
11 This protocol also uses elements outside the current definition of HDLC procedures.
12 The format of the information field of the XID frame of these protocols follows the specifications in ISO/IEC 13239.
13 These optional functions are determined by prior agreement.
14 These protocols only use the response form of the SREJ frame.
15 This protocol only uses the command form of the UI frame.
16 Used only as a response frame.
17 Used only as a response frame, and use/non-use is dependent on recovery mechanism used.
18 Use/non-use is dependent on recovery mechanism used.
19 Extended control field format (module 32 768) has been introduced in X.25 as an option provided by some networks.
20 Use Type 2 frame format field.
21 To be replaced by protocol description document when identified.

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5 Standard XID frame information field format identifiers

Table 2 lists the format identifier values for the standard XID formats that were identified at the time of publication of this Technical Report. The source document for each is shown, and a brief statement of the characteristics of each format is given.

Table 2 – Standard XID information field format identifiers

Format identifier value (low order bit first)	**Source document**	**Format characteristics**
1 0 0 0 0 0 0 1	ISO/IEC 8802-2, Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 2, Logical link control	Provides means for exchanging details of operational capabilities, including types of operations supported (i.e., connectionless or connection-mode, or both) and, in the case of connection-mode operation, the receive window size supported.
0 1 0 0 0 0 0 1	ISO/IEC 13239, Information technology - Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures	Provides means for resolving data link layer address assignments, negotiating data link layer protocol features and parameters (including user-defined parameter), and transferring higher layer information (e.g., data link layer management messages) transparently between stations.
1 1 0 0 0 0 0 1	ITU-T Recommendation G.764, Voice packetization - Packetized voice protocol	Provides means for performing various procedures concerning the operation of packet voice networks.
0 0 1 0 0 0 0 1	ITU-T Recommendation T.90, Characteristics and protocols for terminals for Telematic services in ISDN	Provides means for identification of various services/applications involved in terminals, and for performing various procedures concerning the operation of Telematic terminal characteristics.
1 0 1 0 0 0 0 1	ITU-T Recommendation V.75, DSVD terminal control procedures	Provides means for identifying higher-layer messages carried in V.76 frames in support of Digital Simultaneous Voice and Data (DSVD) control functions

6 Standard mode-setting frame information field format identifiers

Table 3 lists the format identifier values for the standard mode-setting information field content.

Table 3 – Standard mode-setting information field format identifiers

Format identifier value (low order bit first)	**Source document**	**Format characteristics**
1 0 0 0 0 0 0 1	ISO/IEC 13239, Information technology - Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures	Provides means during link setup for resolving data link layer address assignment, negotiating data link layer protocol features and parameter (including user-defined parameters), and transferring higher layer information (e.g., data link layer management messages) transparently between stations.
1 0 1 0 0 0 0 1	ITU-T Recommendation V.75, DSVD terminal control procedures	Provides means during link setup for identifying higher-layer messages carried in V.76 frames in support of Digital Simultaneous Voice and Data (DSVD) control functions.

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7 Parameter identifiers for user-defined parameter subfields

ISO/IEC 13239 defines a user-defined parameter data link layer subfield within the XID information field. This subfield provides for the negotiation of user-defined parameters, which include implementation-specific data link layer parameters supported by users, manufacturers, or standards committees desiring to use single-XID-exchange negotiation procedures to unambiguously negotiate user-defined parameters.

Each user-defined parameter subfield must contain a Parameter Set Identification value, which is associated with the Parameter Identifier of value zero (i.e., PI = 0). These Parameter Set Identification values are determined by prior agreement, and are not a subject of ISO/IEC 13239.

In order to provide an easily up-dated repository to record those Parameter Set Identification values that have been selected by standards committees (as differentiated from those selected by users or manufacturers), table 4 lists the values that were identified at the time of publication of this Technical Report. Further information on each identified parameter set may be found in the referenced source document. Additional entries for table 4 should be made known to ISO/IEC JTC1/SC6/WG1 for publication in the next revision of this Technical Report.

Table 4 - Standard private parameter set identification values

Parameter set identification value	Source document
UTF-8 characters “V42”	ITU-T Recommendation V.42bis - Data compression procedures for DCEs using error correcting procedures.
UTF-8 characters “V120”	ITU-T Recommendation V.120 - Support by an ISDN of data terminal equipment with V-series type interfaces with provision for statistical multiplexing.

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